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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,750	05/15/2007	Van Suong Hoa	789-100	1088

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EXAMINER
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FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
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1761

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12/27/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,750	<b>Applicant(s)</b> HOA ET AL.	
	<b>Examiner</b> Michael J. Feely	<b>Art Unit</b> 1761	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,20-24,26 and 27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3-13 and 27 is/are allowed.
- 6) ☒ Claim(s) 20-24 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### **Pending Claims**

Claims 1, 3-13, 20-24, 26, and 27 are pending.

### **Priority**

1. The instant application is a national stage entry of PCT/CA04/02184, filed December 22, 2004, which claims priority to US provisional application no. 60/531,618, filed December 23, 2003.

- Claims 1, 3-16, 18-24, 26, and 27 are fully supported by the provisional application; accordingly, they have an effective filing date of December 23, 2003.

### **Response to Amendment**

2. The rejection of claims 14-16, 18, and 19 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, has been rendered moot by the cancellation of these claims.

3. The rejection of claims 20-24 and 26 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, has been overcome by amendment.

4. The rejection of claims 14-16, 18, and 19 under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, has been rendered moot by the cancellation of these claims.

5. The rejection of claims 20-24 and 26 under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, has been overcome by amendment.

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6. The rejection of claim 27 under 35 U.S.C. 112, second paragraph, as being indefinite, has been overcome by amendment
7. The objection to claims 14-16, 18, and 19 has been rendered moot by the cancellation of these claims.
8. The objection to claims 1, 3-13, 20-24, 26, and 27 has been overcome by amendment.
9. The rejection of claims 14-16, 18, and 19 under 35 U.S.C. 102(a) as being anticipated by Guraya (US 2003/0026888) has been rendered moot by the cancellation of these claims.
10. The rejection of claims 14-16, 18, and 19 under 35 U.S.C. 102(e) as being anticipated by Guraya (US 2003/0026888) has been rendered moot by the cancellation of these claims.

#### **Declaration Filed Under 37 CFR 1.131**

11. The declaration filed on 22 October 2010 under 37 CFR 1.131 has been considered but is ineffective to overcome Drzal et al. (US 2005/0119371):
  - It appears that the work was performed in Canada; however, the declaration fails to explicitly state where the work was performed. Specifically, it fails to state that the work was performed in the United States, a NAFTA country, or a WTO country member.
  - The declaration fails to demonstrate that the embodiment set forth in claims 20-24 & 26 was conceived and reduced to practice prior to October 15, 2003. The instantly claimed modified epoxy is produced by steps (a), (b), and (c). A flow of a mixture of {solvent & clay} is subjected to (b1), (b2), and (b3) to produce a dispersed clay solution. An epoxy resin is subsequently mixed with the dispersed clay solution to yield the modified epoxy. In contrast, the IP Disclosure Form (see: page 2, "Identify particular aspects of your

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creation that you believe to be original"; page 3, Figure 1) describes a modified epoxy produced by subjecting a flow of a mixture of {solvent, clay & epoxy} to (b1), (b2), and (b3) – see: *"The sudden collapse from high pressure in the tiny pipes to very low pressure in the chamber explodes the particles into the mist of the liquid solution of the matrix."*

### Claim Rejections - 35 USC § 102/103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 20-22 and 24 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Drzal et al. (US 2005/0119371). Note: Drzal et al. claims priority to US provisional application 60/511,258 (filed October 15, 2003), which fully supports the cited portions of the pre-publication. Accordingly, the 102(e) date of Drzal et al. is October 15, 2003.

Regarding claims 20-22 and 24, Drzal et al. disclose: **(20 & 22)** a modified epoxy produced from a pristine epoxy comprising: solvent (paragraphs 0011, 0080, 0098), nano-clay particles (paragraphs 0011, 0080, 0098), and pristine epoxy (paragraphs 0011, 0080, 0098), wherein clay particles of nano-dimensions are finely and homogeneously distributed in the modified epoxy (paragraphs 0011, 0080, 0098); **(21)** comprising finely dispersed clay

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agglomerates of less than about 1  $\mu\text{m}$  and agglomerates of a maximum diameter between about 1  $\mu\text{m}$  and 2  $\mu\text{m}$  (paragraphs 0011, 0080, 0098); and **(24)** further comprising additives (paragraph 0098: modified clay).

Drzal et al. form their dispersion by: (a) creating a solution of solvent, nano-clay, and epoxy; and (b) sonicating the solution. Accordingly, Drzal et al. fail to disclose the claimed steps of:

(a) mixing solvents and clay particles of a dimension in the nanometer range to form a clay solution, agglomerates of clay particles forming in the clay solution;

(b) submitting a flow of the clay solution to: (1) high pressure; (2) a high velocity and breaking impacts in a region of obstacles to allow the agglomerates to be broken down; and (3) a sudden lower pressure; and

(c) mixing the dispersed clay solution with at least part of the pristine epoxy.

However, it should be noted that the instant claims are provided in product-by-process format. In light of this, it has been found that, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process,” – In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (see MPEP 2113).

Therefore, it appears that the instantly claimed modified epoxy is the same or an obvious variation of the one set forth in Drzal et al. because the final product of Drzal et al. satisfies all of the material/chemical limitations of the instant invention.

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Further regarding claims 20 and 22, Drzal et al. fail to explicitly disclose: **(20)** the modified epoxy having at least higher barrier properties and thermal resistance than the pristine epoxy; and **(22)** wherein a content of about 1 wt % of clay loading yields an increase in a fracture toughness, with an increase in  $K_{IC}$  and  $G_{IC}$  of up to 2 and 3 times with respect to the pristine epoxy respectively. However, it appears that the composition of Drzal et al. would have inherently satisfied the property limitations of claim 20 because they satisfy all of the material/chemical limitations of the instant invention. Furthermore, it appears that the composition of Drzal et al. would have been inherently capable of satisfying the property limitations of claim 22 at the appropriate loadings (which are not explicitly required by the claim).

In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the composition of Drzal et al. would have inherently satisfied the property limitations of claim 20 because they satisfy all of the material/chemical limitations of the instant invention. Furthermore, it appears that the composition of Drzal et al. would have been inherently capable of satisfying the property limitations of claim 22 at the appropriate loadings.

**Claim Rejections - 35 USC § 103**

14. Claims 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drzal et al. (US 2005/0119371) in view of Furihata (US Pat. No. 4,465,542).

Regarding claim 23, the teachings of Drzal et al. are as set forth above and incorporated herein. Drzal et al. desire toughness and flexibility in their composition; however, they fail to explicitly disclose: **(23)** wherein said pristine epoxy is a rubber-modified epoxy.

The teachings of Furihata demonstrate that rubber materials, such as CTBN, are recognized in the art as suitable additives for epoxy/clay compositions that require toughness and flexibility (see Abstract; column 6, lines 37-53). In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a prima facie obviousness determination – see MPEP 2144.07.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add rubber to the composition of Drzal et al. because the teachings of Furihata demonstrate that rubber materials are recognized in the art as suitable additives for epoxy/clay compositions that require toughness and flexibility.

Regarding claim 26, the combined teachings of Drzal et al. and Furihata are as set forth above and incorporated herein. The combined teachings fail to explicitly disclose: **(26)** the modified epoxy has an increase in  $K_{IC}$  and  $G_{IC}$  of up to 2.2 and 7.6 times at 6-phr loading and 20-phr CTBN compared with the pristine epoxy. However, it appears that the combined teachings would have been inherently capable of satisfying these property limitations at the appropriate loadings (which are not explicitly required by the claim).



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Furthermore, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the combined teachings of Drzal et al. and Furihata would have been inherently capable of satisfying the property limitations of claim 26 at the appropriate loadings.

### **Response to Arguments**

15. Applicant's arguments filed 22 October 2010 have been fully considered but they are not persuasive.

Applicant argues that Drzal et al. no longer qualifies as prior art. However, the declaration filed under 37 CFR 1.131 is ineffective to overcome Drzal et al. (US 2005/0119371) for the reasons set forth above in section 11 of the instant Office action.

### **Allowable Subject Matter**

16. Claims 1, 3-13, and 27 are allowed.

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### **Conclusion**

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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### **Communication**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/  
Primary Examiner, Art Unit 1761

December 22, 2010